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COMPLETE SPECIFICATION

DRAWINGS ATTACHED

A Universal Metal Working Press

We, KABUSHIKI KAISHA HARIMA ZOSENJO, of 2, Otemachi 2-chome, Chiyoda-Ku, Tokyo, Japan, a Japanese Corporation, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to a universal metal working press, and more particularly to a hydraulic press.

In this invention, a work metal plate such as, for example, an iron plate, a steel plate, a brass plate, an aluminium plate, or the like is put on a lower die and the work plate is pressed down by an upper die actuated by hydraulic pressure.

In a conventional press of this type, the first requirement is to make a pair of dies especially adapted to the desired form. This takes considerable time and the processing costs are high. Furthermore, a long time is taken up in working the sheet metal work-piece.

An object of the invention is to provide a universal metal working press in which there is no necessity for changing the upper and lower dies.

A further object of the invention is to provide a hydraulic universal metal working press for working the metal sheet to make the desired shape quickly and easily.

A still further object of the invention is to provide a universal metal working press which increases operational efficiency and reduces processing costs.

According to the invention a universal metal working press is provided comprising a framework, hydraulic ram means mounted on the framework, a crosshead actuated by the hydraulic ram means, an upper press die-supporting means mounted on the crosshead, struts for guiding the crosshead and

a bed on which is mounted a lower press die portion.

A plurality of the die-forming rods which are individually rotatable are provided oppositely on the upper and lower press die-supporting means, respectively. By adjusting the die-forming rods suitably, the pressing pads provided with the die-forming rods are moved, and the upper and lower die surfaces being formed by the tops of the pads.

The invention is diagrammatically illustrated by way of example in the accompanying drawings, in which,

Figure 1 is a side elevation partly in section of a universal hydraulic metal working press machine embodying the invention;

Figure 2 is an end view of Figure 1;

Figure 3 is an enlarged longitudinal section of the operating portion forming an essential part of the invention; and

Figure 4 is a sectional view on the line IV-IV of Figure 3.

Referring to the drawings in detail, a universal metal working press is illustrated which includes a framework 1, a ram 2 mounted on the framework, a crosshead 3 operated by the ram, struts 4 for guiding the crosshead, and a bed 5 which supports the above elements thereon.

An upper press die-supporting element 8 and a lower press die-supporting element 9 are respectively fitted by means of frame parts 6 and 7 to the crosshead 3, and to the bed 5 respectively. Since the foregoing construction of the press according to the invention is substantially the same as a conventional hydraulic press, the detailed description of the constituent elements is omitted and the essential mechanism of the invention hereinafter described.

According to the invention, as shown in Figures 1 and 2, the upper and lower press dies constitute a plurality of die-forming rods

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A and B. The rods A and B are the same in construction and operation.

As shown in Figure 3, the die-forming rod A is adjustably mounted on a press die-supporting member 8. A driven shaft 10 of the die-forming rod A is rotatably supported by the press die-supporting member 8, but is prevented from moving longitudinally. The driven shaft 10 is capable of being rotated by conventional means such as, for example, a handle or the like which is secured on the shaft. The driven shaft 10 is secured in a bore 14 of a screw rod 11 which engages in a threaded hole 12 provided in the lower part of the press die-supporting member 8. The cross section of the driven shaft 10 to be inserted into the bore 14 of the screw rod 11 is square, as also is the cross section of the bore 14 (Figure 4.) The driven shaft 10 is capable of sliding longitudinally in the bore 14. A die-forming pad 13 is secured on an end of the screw rod 11. The screw rod 11 is rotated by the rotation of the driven shaft 10, and moves longitudinally being guided in the screw hole 12. In rotating the driven shaft, the screw shaft 11 is simultaneously rotated and moves longitudinally, being guided in the screw threaded hole 12, independently of the driven shaft.

Although, in the embodiment illustrated in the drawings, the cross section of each of the driven shafts and of the bore of the screw shaft to be connected with each other is square, it may have polygonal or other form. Furthermore the connection of the driven shaft with the screw shaft may be made in other conventional ways such, for example, as by a spline coupling. Since the lower surface formed by the tops of the pads 13 contacts with a surface of the sheet metal workpiece 14 under hydraulic pressure, and presses down on the lower die, the top of the pad 13 may preferably be formed of hemispherical section.

As shown in Figures 1 and 2, the press die forming rods A and B operated by their driven shaft 10, with the screw rod 11 fitted into the driven shaft, and the pad 13 mounted on the top of the screw rod are respectively arranged relatively to the upper press die-supporting portion 8, and the lower press die-supporting portion 9, so as to face the ends of both the upper and lower pads.

According to the press of the invention, each of the driven shafts 10 is rotated in the desired direction by conventional means, the surface of the male die is formed by the tops of the upper group of the pads 13 of the upper press die forming rods A, and the surface of the lower or female die is formed by the tops of the lower group of the pads 13 facing the surface of the male die. After the sheet metal workpiece, such for example as the steel plate 14 is inserted between the surfaces of the male and female dies, the

crosshead 3 is moved down along the struts 4 by the operation of the rams 2 by conventional means, and the steel plate 14 is pressed by the upper and the lower groups of the pads into the desired shape.

Furthermore, in the operation of the press according to the invention, after forming the desired male and female dies by rotating the driven shafts 10, if the gaps between the pads of the male die or the female die are respectively filled with a suitable coagulating agent, so that the surface of each of the male and female dies provides a smooth surface, and therefore, will be suitable for working a soft metal sheet.

It will be appreciated that a press according to the invention is particularly economical in operation since the dies are changed according to the shape of the work to be processed which is easily done by rotating the die-forming rods. The press of the invention therefore has greater efficiency than the conventional press in which the dies are changed and made in accordance with the shape of the work.

WHAT WE CLAIM IS:—

1. A universal metal working press having a framework, a hydraulic press means mounted on said framework, a crosshead actuated by the press means, struts for guiding the crosshead, an upper press die-supporting member a bed for supporting the above elements, the bed having a lower press die-supporting member, a plurality of adjustable die-forming rods mounted on the upper and lower press die-supporting members, a pad secured on an end of each of the rods, forming the die surfaces and in which the die-forming rods are capable of individual rotation, and are connected to a driven shaft which is incapable of moving longitudinally.

2. A universal metal working press according to claim 1, in which the die-forming rod is a screw rod.

3. A universal metal working press according to claim 1, in which the surfaces of the pads are of hemispherical cross-section.

4. A universal metal working press according to claim 1, in which a plurality of die-forming rods are driven by suitable means such, for example, as an electric motor by means of a driven shaft.

5. A universal metal working press according to claim 1, in which a plurality of die-forming rods are driven by manual means by a handle through a driven shaft.

6. A universal metal working press, substantially as hereinbefore described and illustrated in the accompanying drawings.

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FIG.1.

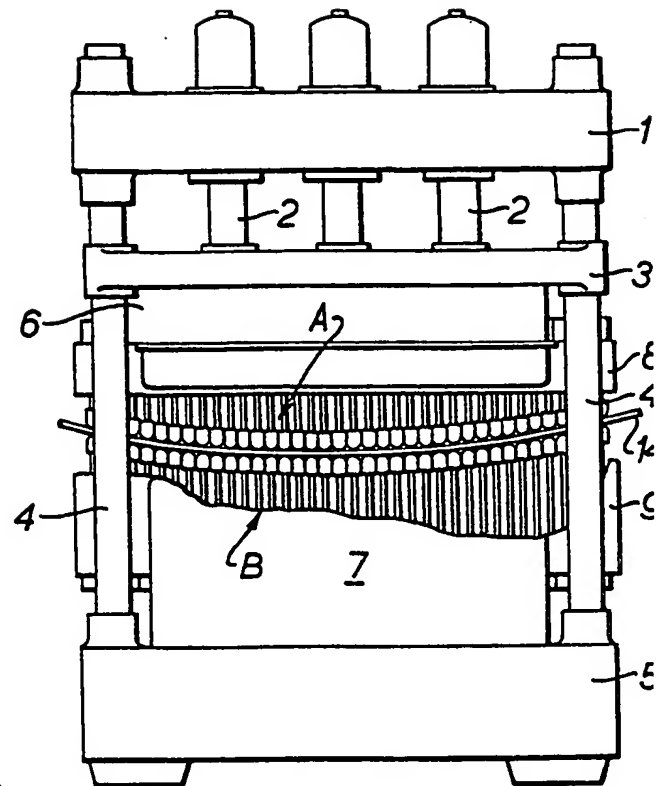
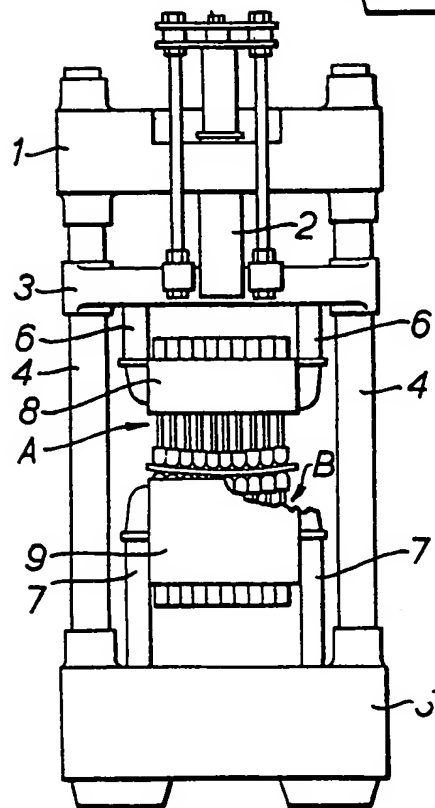


FIG.2.



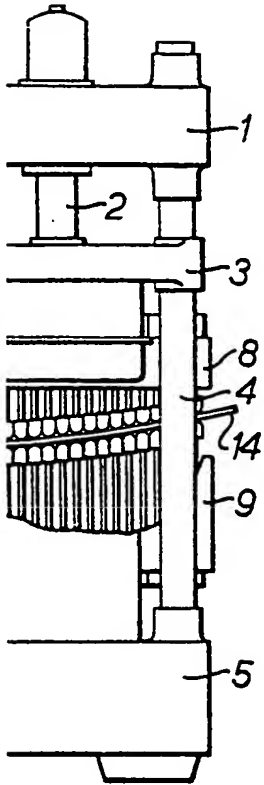


FIG. 3.

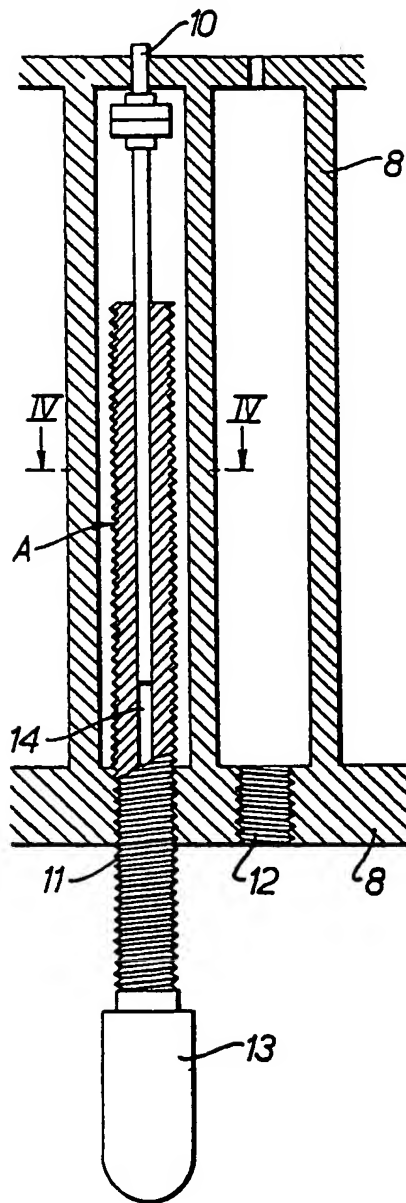


FIG. 4.

